

Claims

I CLAIM:

- 5 1. A method for improving a quality of a first signal in a chemical separation scheme, said method comprising the steps of:
 - (a) dividing the first signal into a plurality of segments;
 - (b) operating on signals within each of the plurality of segments using an operation selected from a group consisting of integration, summation, and statistical correlation; and
 - 10 (c) concatenating the results of the operation from the plurality of the segments into a less noisy, second signal.
- 15 2. The method of claim 1 wherein the first signal is a sequential signal from a sequential separation process.
3. The method of claim 1 additionally comprising the step of filtering the second signal.
- 20 4. The method of claim 2 additionally comprising the step of filtering the second signal.
5. The method of claim 3 wherein the filtering is done with an analog filter.
6. The method of claim 4 wherein the filtering is done with an analog filter.
- 25 7. The method of claim 3 wherein the filtering is done with a digital filter.
8. The method of claim 4 wherein the filtering is done with a digital filter.

5 **9.** The method of claim **3** wherein said filtering comprises a low-pass analog filter having the following characteristic: it attenuates noise or error corresponding, in time or frequency, to noise or error associated with time or frequency of one of said signal segments.

10 **10.** The method of claim **4** wherein said filtering comprises a low-pass analog filter having the characteristic that it attenuates noise or error corresponding, in time or frequency, to noise or error associated with time or frequency of one of said signal segments.

15 **11.** The method of claim **2** wherein the step of dividing the first signal comprises dividing the first signal into at least 10 segments, each segment being equal by flow.

12. The method of claim **3** wherein the step of dividing the first signal comprises dividing the first signal into at least 10 segments, each segment being equal by flow.

20 **13.** The method of claim **2** wherein the step of dividing the first signal comprises dividing the first signal into at least 10 segments, each segment being equal by volume.

25 **14.** The method of claim **3** wherein the step of dividing the first signal comprises dividing the first signal into at least 10 segments, each segment being equal by volume.

15. The method of claim **1** wherein the segments overlap.

16. The method of claim 15 wherein the first signal is a discrete signal, said method comprising the steps of:

- 5 (a) selecting a predetermined number of consecutive points of the first signal, said number of points comprising a first and a last point, considered chronologically;
- (b) operating on the values of the consecutive points using an operation selected from a group consisting of integration, summation, and statistical correlation;
- 10 (c) selecting a next predetermined number of consecutive points, wherein the first point used in the previous set of points is not used;
- (d) operating on the values of the consecutive points using an operation selected from a group consisting of integration, summation, and statistical correlation; and
- 15 (e) repeating these steps until all points of the first signal have been included in the operation.

17. An apparatus for improving a quality of a first signal in a chemical separation scheme, said apparatus comprising:

- 20 (a) a signal divider for dividing the first signal into a plurality of segments;
- (b) a computer for operating on signals within each of the plurality of segments using an operation selected from a group consisting of integration, summation, and statistical correlation; and
- 25 (c) a concatenator for concatenating the results of the operation from the plurality of the segments into a less noisy, second signal.

18. The apparatus of claim 17 wherein the first signal is a sequential signal from a sequential separation process.

30 19. The apparatus of claim 17 additionally comprising a filter with which to

filter the second signal.

20. The apparatus of claim 18 additionally comprising a filter with which to filter the second signal.

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21. The apparatus of claim 19 wherein the filter is an analog filter.

22. The apparatus of claim 20 wherein the filter is an analog filter.

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23. The apparatus of claim 19 wherein the filter is a digital filter.

24. The apparatus of claim 20 wherein the filter is a digital filter.

15 25. The apparatus of claim 19 wherein said filter comprises a low-pass analog filter having the following characteristic: it attenuates noise or error corresponding, in time or frequency, to noise or error associated with time or frequency of one of said signal segments.

20 26. The apparatus of claim 20 wherein said filter comprises a low-pass analog filter having the characteristic that it attenuates noise or error corresponding, in time or frequency, to noise or error associated with time or frequency of one of said signal segments.

25 27. The apparatus of claim 18 wherein the signal divider for dividing the first signal comprises means for dividing the first signal into at least 10 segments, each segment being equal by flow.

30 28. The apparatus of claim 19 wherein the signal divider for dividing the first signal comprises means for dividing the first signal into at least 10 segments, each segment being equal by flow.

29. The apparatus of claim 18 wherein the signal divider for dividing the first signal comprises means for dividing the first signal into at least 10 segments, each segment being equal by volume.

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30. The apparatus of claim 19 wherein the signal divider for dividing the first signal comprises means for dividing the first signal into at least 10 segments, each segment being equal by volume.

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31. The apparatus of claim 17 wherein the segments overlap.

32. The apparatus of claim 31 wherein the first signal is a discrete signal, said apparatus comprising:

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(a) means for selecting a predetermined number of consecutive points of the first signal, said number of points comprising a first and a last point, considered chronologically;

(b) a computer for operating on the values of the consecutive points using an operation selected from a group consisting of integration, summation, and statistical correlation;

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(c) means for selecting a next predetermined number of consecutive points, wherein the first point used in the previous set of points is not used;

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(d) a computer for operating on the values of the consecutive points using an operation selected from a group consisting of integration, summation, and statistical correlation; and

(e) means for repeating these steps until all points of the first signal have been included in the operation.

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